THE ZOOLOGIST.

THIRD SERIES.

Vol. V.] AUGUST, 1881. [No. 56.

NOTES ON THE FOOD OF BIRDS.

Collected by Frank Norgate.

Hobby.—In addition to small birds, feeds on the dung-beetle, *Geotrupes stercorarius* (Yarrell), and dragonflies (Harting).

Red-footed Falcon.—Large Coleoptera (Yarrell) and dragonflies (Harting).

Merlin.—Chiefly Larks, Pipits, and Linnets; occasionally Snipe and Dunlin; also large moths, principally of the Eggar species (Booth, Zool. 1878, p. 133).

Kestrel.—Chiefly field-mice and grasshoppers; occasionally small birds, especially Starlings (Harting). Coleopterous insects and their larvæ, earthworms, cockchaffers (Yarrell), meadow brown (?) butterfly (F. Norgate).

Sparrowhawk.—Birds, mice, and lizards.

Kite.—Twenty-two moles have been found in a Kite's nest. It preys also on frogs and snakes (Yarrell), and on young game of all kinds (Booth, Zool. 1879, p. 58).

Rough-legged Buzzard.—Remains of six rats in one stomach ('Field,' Nov. 20th, 1880). Mice, frogs, &c. (Yarrell).

Honey Buzzard.—Wasps and their larvæ, Coleoptera and their larvæ, whitish coloured hairy larvæ, pupæ of a butterfly and of the six-spot Burnet moth, frogs and grey snails, larvæ of bees, rats, and lizards (Yarrell).

Marsh Harrier.—Small mammals and birds, especially the young of waterfowl, reptiles and fish (Yarrell).

Hen Harrier.—Small birds of all kinds. Twenty lizards found in one specimen (Yarrell).

Montagu's Harrier.—Five lizards found in one specimen (Yarrell).

Scops Eared Owl.—Mr. W. Spence says, "It feeds wholly upon beetles, grasshoppers, and other insects" (Yarrell). Earwigs and larvæ of various kinds (Stevenson).

Short-eared Owl.—January, mice; February, harvest-mice; March, mice; April, crickets and field-mice; May, shrews and cockchaffers; June, beetles; July, field-mice and birds; August, field-mice and shrews; September, field-mice and beetles (Florent Prevost); October, field-mice and beetles; November, mice and field-mice; December, mice, spiders and woodlice. Rats and bats (Yarrell).

Long-eared Owl.—January, February and March, mice; April, cockchaffers; May, cockchaffers, rats and squirrels; June, mealworms, beetles and shrews; July, mice, ground- and other beetles; August, mice and shrews; September, October and November, mice (Florent Prevost). Rats, moles, mice, and small birds (Yarrell).

Barn Owl.—January and February, mice; March, April, May and June, field-mice; July and August, mice; September and October, field-mice and shrews; November, mice and black rats; December, mice (Florent Prevost). Sparrows and Greenfinches (Harting). Rats and mice; perch (Yarrell). One nest of Barn Owls was supplied with twenty fresh rats, all killed in one night. Other nests were supplied, some with rats only, some with mice only. One nest contained many bushels of the remains of rats, mice, voles and shrews, and a few wireworms. On examining more than thirty nests I found the remains of only one bird, a Blackbird, which appeared to have been used as food, besides the rats and mice and shrews. (F. Norgate.)

Tawny Owl.—According to Dr. Altum, fifty-two pellets of Tawny Owl contained three *Crossopus fodiens*, one *Crocidura araneus*, ten *Sorex vulgaris*, eleven *Talpa europæa*, one *Mus decumanus*, two *M. musculus*, six *M. sylvaticus*, two *Arvicola amphibius*, one *A. glareolus*, one *A. agrestis*, thirty-three *A. arvalis*, one *Sciurus vulgaris*, one *Emberiza citrinella*, eleven other small birds; fourteen *Carabus granulatus*, four *Dytiscus* *marginalis*, four *Scarabæus stercorarius*, one *Silpha rugosa*, and two *Harpalus* sp.? (Dresser). Moles, rats, mice, frogs, birds, insects, bullhead, loach, and other fish, &c. (Yarrell).

Snowy Owl.—Feeds almost exclusively on lemmings, near Discovery Bay. Twenty-seven lemmings and remains of a hare were arranged round one nest of eggs and young; such supplies were also seen surrounding a nest of eggs alone (H. Chichester Hart, Zool. 1880, pp. 122, 123).

Hawk Owl.—Mice, insects and birds (Yarrell).

Tengmalm's Owl.—Mice and large insects (Yarrell).

Great Grey Shrike.—Large insects, especially beetles, mice, shrews, frogs, lizards, and small birds (Yarrell). Wasps and *Vanessa Urticæ* (Stevenson).

Red-backed Shrike.—May chaffer and other insects, mice and small birds (Yarrell). Impaled on acacia and whitethorn I have found one *Carabus violaceus*, one *Geotrupes*, one fragment of *Necrophorus*, two *Bombus virginalis*, five *B. leucorum*, five *B. Latreillellus*, six *B. lapidarius*: of these four species of humble-bees, eighteen specimens were queens. Also one frog, one Wren, one Ray's Wagtail, one young Linnet, and two Sand Martins (F. Norgate).

Spotted Flycatcher.—Believed to feed almost exclusively on winged insects (Yarrell). Bluebottle-flies (Bartlett).

Pied Flycatcher.—Winged insects (Yarrell.)

Dipper.—Beetles, larvæ of *Ephemeræ* and *Phryganeæ* (Yarrell). Soft-shelled Mollusca, such as *Limnæa*, *Ancylus*. Various water-beetles and their larvæ, water-spiders (*Argyroneta*), dragonflies (*Agrion*) and their pupæ, and the larvæ of caddis-flies (Harting). The water-boatman (*Notonecta*), larvæ of *Ephemera* (most destructive to salmon-spawn), *Phryganea*, *Hydrophilus* (most of these insects feed on fish-spawn), besides such fresh-water molluscs as *Lymnea* and *Ancylus*, already named (Stevenson).

Song Thrush.—Snails and worms, insects of various species, and fruit.

Fieldfare and Redwing.—Larvæ, worms, slugs, beetles, and berries of various kinds.

Blackbird.—Larvæ, worms, snails, and fruit. In January the Blackbird feeds on spiders, pupæ, and seeds; February, spiders, pupæ, and seeds; March, grubs, worms, and buds of trees; April, insects, grubs, and worms; May, cockchaffers and worms; June, worms, grubs, and fruits; July, all sorts of insects, worms, and fruit; August and September, all sorts of insects, worms, and fruit; October, worms, pupæ and grubs of butterflies; November and December, pupæ, corn, and seeds (Florent Prevost).

Ring Ouzel.—Larvæ, worms, snails, and fruits (Yarrell).

Golden Oriole.—Larvæ, insects, fruit (Yarrell). In January the Golden Oriole feeds on pupæ; February, pupæ and worms; March, grubs and beetles: April, ground-beetles and weevils; May, beetles, moths, grubs, and butterflies; June, grubs, grasshoppers, bees, and cherries; July, beetles and cherries; August, weevils, pupæ, worms, and fruit; September, beetles, grubs, worms, and fruit; October, grubs, green herbs, pupæ, berries, and barley; November, worms and ants (Florent Prevost).

Alpine Accentor.—Insects and seeds (Yarrell).

Hedge Sparrow.—Insects (chiefly spiders and small beetles), worms, and seeds.

Redbreast.—Earth-worms, insects, fruit. In January the Robin feeds on insects, pupæ, and worms; February, insects, worms, and wood-lice; March, pupæ and worms; April, moths, eggs of insects, and cockchaffers; May, grubs and beetles; June, flies, moths, spiders, and worms; July, moths, butterflies, and woodlice; August and September, moths, butterflies, woodlice, and worms; October, eggs of insects and aquatic insects; November, worms and pupæ; December, pupæ, larvæ, and eggs of moths (Florent Prevost).

Bluethroat.—Insects, earthworms, berries (Yarrell).

Redstart.—Worms, beetles and their grubs, flies, spiders, ants and their eggs, fruit (Yarrell). Redstarts feed their young with little green grubs from gooseberry trees twenty-three times per hour, usually with more than one grub at a time (Bishop Stanley).

Black Redstart.—Insects, worms, fruit (Yarrell).

Stonechat.—Small-winged insects, beetles and worms.

Whinchat.—Insects, worms, small testaceous Mollusca, small white meadow slugs, and berries.

Wheatear.—Small beetles and spiders (Stevenson). Insects and worms (Yarrell).

Grasshopper Warbler.—Insects and small snails.

SEDGE WARBLER.—Aquatic insects, worms, and small freshwater Mollusca.

SAVI'S WARBLER.—Insects and worms (Yarrell).

REED WARBLER.—Aquatic insects, *Libellulæ*, small worms, and aquatic Mollusca.

GREAT REED WARBLER. — March, insects; April, aquatic grubs; May, grubs of house-fly and dragonfly; June, worms, grubs, flies, and May-flies; July, beetles and dragonflies; August, worms, eggs of insects, and beetles; September, aquatic insects (Florent Prevost).

NIGHTINGALE.—Flies, moths, spiders, and earwigs. Young Nightingales are fed principally on small green caterpillars (Yarrell). In February the Nightingale feeds on grubs and worms; March, grubs, worms, pupæ, and ground-beetles; April, flies, meal-worms, beetles, red worms; May, butterflies, weevils, cockchaffers, and grubs; June, spiders and wood-boring beetles; July, worms, grubs, eggs of locusts, grasshoppers, moths, flies; August, glow-worms, weevils, grubs; September, locusts, worms, beetles, dragonflies; October, grubs, beetles, and worms; November, flies and worms (Florent Prevost).

BLACKCAP and GARDEN WARBLER.—Insects and fruit (Yarrell).

WHITETHROAT.—Supposed to feed on gooseberry-sawfly larvæ (Rev. T. H. Marsh). Insects, particularly white caterpillars, fruit.

LESSER WHITETHROAT.—Insects and fruit.

WOOD WARBLER.—Insects and their larvæ.

WILLOW WARBLER.—Flies, Aphides, and other insects.

CHIFFCHAFF.—Gnats, flies, Aphides, moths, and small larvæ.

DARTFORD WARBLER.—Small insects (Yarrell). Feeds its young on the bodies of a large yellow moth (Booth, Zool. 1877, p. 59).

TITMICE.—In the spring destroy *Cheimatobia brumata*, females and larvæ (Stevenson). They feed their young about sixteen times per hour (Bishop Stanley).

GREAT TIT. — In January, beetles and eggs of insects; February, grubs; March, water-snails, beetles, and grubs; April, bees, cockchaffers, and beetles; May, bees, cockchaffers, and beetles; June and July, cockchaffers, flies, and other insects; August, insects and fruits; September, seeds, grasshoppers, and crickets; October, berries; November, seeds (Florent Prevost).

BLUE TIT.—Aphides, other insects, and seeds (Yarrell). Aphides from gooseberry-bushes (F. Norgate). Feeds young on very small green caterpillars. Rears from nine to fourteen young in each brood, and feeds them about three hundred times a day (F. Norgate). If eggs or nest be repeatedly destroyed, Blue Tits will lay four or five times in succession in one summer (about forty eggs altogether). Blue Tits and Great Tits may be encouraged and increased to almost any extent by hanging up suitable nesting-boxes (F. Norgate).

CRESTED TIT.—Insects and small seeds of evergreens (Yarrell).

COLE TIT.—Insects (bees ?), thistle-seeds (Yarrell).

LONG-TAILED TIT.—Insects (Yarrell).

BEARDED TIT.—Insects, seeds, and testaceous Mollusca, such as *Succinea amphibia* and *Pupa muscorum* (Yarrell). Mr. Dykes found in the crop of one Bearded Tit twenty *Succinea amphibia* and four *Pupa muscorum* (Stevenson).

WAXWING.—Berries of rowan, hawthorn, ivy, yew, and insects taken on the wing (Yarrell).

PIED WAGTAIL.—Insects, especially aquatic species and their larvæ, and minnows (Yarrell).

GREY WAGTAIL.—Aquatic insects and small Mollusca, such as *Cyclas cornea* and *Ancylus fluviatilis*.

GREY-HEADED WAGTAIL.—Aquatic insects, small green caterpillars, flies, and moths.

RAY'S WAGTAIL.—Small insects (Yarrell).

TREE PIPIT and MEADOW PIPIT.—Insects and worms (Yarrell).

ROCK PIPIT.—Aquatic insects.

RICHARD'S PIPIT.—Several species of flies and gnats. A ladybird and ichneumon were found in the stomach of one killed at Yarmouth in April (Stevenson).

SHORE LARK.—Insects, grass, seeds, &c.

SKY LARK.—Grain, grass, seeds, insects, and worms. In January, seeds of wild plants; February, seeds and corn; March, various insects, worms, seeds, and corn; April, insects, beetles, and corn; May, beetles; June, flies and various insects; July, grasshoppers, corn, and worms; August, crickets and grasshoppers; September, insects, seeds of weeds, and corn; October, seeds, barley, and worms; November, seeds, corn, and berries (Florent Prevost).

WOOD LARK.— Grain, grass, seeds, insects, and worms (Yarrell).

SHORT-TOED LARK.—Insects and seeds (Yarrell).

Lapland Bunting.—Seeds of *Arbutus alpina* (Yarrell).

Snow Bunting.—Grass seeds, buds of *Saxifraga oppositifolia*, and Mollusca. Feeds its young on insects (Yarrell). Caterpillars, vegetables, and seeds (H. C. Hart).

Bunting.—Grain (Yarrell).

Reed Bunting.—Insects, seeds, and grain.

Yellow Bunting.—Insects, seeds, and grain.

Cirl Bunting.—Berries of *Solanum dulcamara.* Feeds its young on insects.

Ortolan.—Grain, seeds, and insects.

Chaffinch.—Larvæ of gooseberry-sawfly (Rev. T. H. Marsh). Insects, seeds, and tender vegetables (Yarrell). In March, insects, &c.; April, moths, flies, and various insects; May, cockchaffers, grubs, and eggs of insects; June, cockchaffers, grubs and eggs of insects, and wild fruits; July, cockchaffers, grubs and eggs of insects, grubs of beetles, and wild fruits; August, moths and butterflies; September, eggs of insects, worms, and seeds; October, wood-boring beetles, insects, and seeds; November, December, January, and February, seeds (Florent Prevost).

Brambling.—Seeds of *Polygonum aviculare* (Yarrell).

Tree Sparrow.—Insects, soft vegetables, and seeds (Yarrell).

House Sparrow.—Seeds, soft fruits, insects, particularly larvæ; also young vegetables. Feeds its young thirty-six times per hour (Bishop Stanley). Feeds young almost exclusively on insects injurious to man; in the country it eats seeds, grain, and grubs of butterflies; in towns it lives on all kinds of *débris,* but prefers cockchaffers and other insects to every kind of food (Florent Prevost). Destroys in immense quantities small *Melolonthæ*, called "Chovies" (Stevenson).

Greenfinch.—Grain, seeds, insects, and soft vegetables (Yarrell). In January, worms, seeds, berries, wild fruits; February and March, the same; April, the same, and insects; May, June, July, and August, the same; September, October, November, and December, worms, seeds, berries, and wild fruits (Florent Prevost).

Goldfinch.—Caterpillars and other insects; seeds of thistle, burdock, dandelion, chickweed, groundsel, plantain, and alder (Yarrell).

Siskin.—Ragweed, beechmast, and other seeds.

Linnet.—Seeds of flax, thistle, and dandelion; and particularly of cruciform plants. In May, insects, seeds, and berries ; June, insects, seeds, and berries; July, insects, seeds, and berries; August, insects, seeds, and berries; September, insects, seeds, and berries; October, November, December, January, February, March, and April, seeds, berries, &c. (Florent Prevost).

Twite.—Heads of *Centaurea nigra* (Yarrell).

Bullfinch.—One in confinement ate 238 seeds of *Cnicus lanceolatus* (the spear-plume thistle) in about twenty minutes, though plentifully supplied with hemp-seed (Stevenson). *Cheimatobia brumata*, female, and larvæ in the spring (Stevenson); as also the blossom-buds of plum, apple, medlar, cherry, and gooseberry; and in winter, hips, the fruit of the dog-rose, berries, and seeds (Yarrell).

Crossbill.—Seeds of fir, apple, and mountain ash (Yarrell). Vast flocks of Crossbills at Hungerford in July, 1810, destroying Aphides on the young shoots of cherry-trees, observed by Mr. Hall, who says, "The Crossbill places its bill to the side of the leaf, and clears them out (though covered with insects) in a few seconds" (Zool., 1880, p. 321).

Starling.—Insects, worms, snails, berries, grain. Often perches on the backs of sheep, apparently searching for insects. In January, the food consists of worms, grubs of cockchaffers, grubs in dung; February, grubs, snails, and slugs; March, snails and grubs of cockchaffers; April, grubs of cockchaffers and snails; May, grubs of cockchaffers, snails, and grasshoppers; June, flies and their larvæ; July, grubs and fresh-water molluscs; August, flies, glow-worms, and beetles; September, green locusts, worms, and grubs of carrion-beetles; October, worms and beetles; November, snails, slugs, and grubs. In summer, also fruit. In winter, also hips, haws, and buds of trees (Florent Prevost).

Red-winged Starling.—Coleoptera (Stevenson & Lubbock).

Rose-coloured Pastor.—Insects appear to form a principal part of their food; but they are also partial to fruit, such as cherries; and grain, such as *Andropogon sorghum* and *Panicum spicatum*. Destructive to locusts. Perch on sheep and cattle for insects (Yarrell).

Chough.—Five Choughs kept on a lawn were incessantly employed in destroying grubs which were in the roots of the grass and were turning part of the lawn brown (Bishop Stanley).

The Chough also feeds on grasshoppers, fern-chaffers, great chaffers, and other insects, berries, and occasionally grain. It also follows the plough for upturned grubs (Yarrell).

RAVEN, CROW, and HOODED CROW.—Small Mammalia, birds, eggs, reptiles, grain, insects, molluscs, and carrion.

ROOK.—Grubs of common cockchaffer, locusts, wireworms of several sorts, larvæ of the crane-fly, caterpillars of *Agrotis segetum* (Yarrell). Also grain and walnuts, and in dry summers they destroy many eggs (F. Norgate). In January, Rooks eat field-mice and grubs of cockchaffers; February, red-worms, field-mice, and grubs of cockchaffers; March, larvæ and pupæ; April, slugs, worms, and pupæ; May, beetles, larvæ, prawns, and wireworms; June, cockchaffers, eggs of birds, and wood-boring beetles; July, young birds, beetles, &c.; August, birds, field-mice, weevils, grasshoppers, crickets, &c.; September, worms and grubs; October, grasshoppers, ground-beetles, and young animals; November, young rabbits, grubs, and insects; December, animal and decaying substances (Florent Prevost).

JACKDAW.—Insects, seeds, grain, eggs, carrion, Mollusca, and Crustacea. They also perch on the backs of sheep for insects or wool, perhaps both (Yarrell).

MAGPIE.—Young animals, young birds, eggs, fish, carrion, insects, fruit, and grain (Yarrell). In January, grubs of cockchaffers, beetles, and seeds; February, grubs of cockchaffers, beetles, seeds, and berries; May, cockchaffers, glow-worms, and fruit; June, cockchaffers, glow-worms, weevils, and fruit; July, beetles and field-mice; August, birds' eggs and weevils; September, beetles, worms, barley, and grasshoppers; October, grasshoppers, carrion-beetles, and green locusts; November, grasshoppers and kernels of fruit; December, grubs of cockchaffers, berries, and young rabbits (Florent Prevost).

JAY.—Insects, worms, peas, cherries (Yarrell). January, grubs of cockchaffers, acorns, and berries; February, pupæ, grain, seed; March, grubs, insects, corn; April, grubs, beetles, and snails; May, cockchaffers and locusts; June, eggs of birds, cockchaffers, and beetles; July, young birds, flies, and beetles; August, young birds, flies, beetles, acorns, grubs, and dragonflies; September, young birds, flies, acorns, beetles, grubs, dragonflies, and fruits; October, beetles, slugs, snails, and grain; November, beetles, slugs, snails, and grain; December, slugs, beetles, snails, grain, haws, and hips (Florent Prevost).

NUTCRACKER.—Coleoptera, *Geotrupes stercorarius* (Stevenson). Insects, seeds of pines, pinaster, and stone pine; beechmast and nuts, eggs, and young birds (Yarrell).

GREAT SPOTTED WOODPECKER.—Various insects, ants and their eggs, spiders, and seeds (Yarrell). Blue and green flies (F. Norgate). *Cossus ligniperda* (T. E. Gunn).

GREEN WOODPECKER.—January, ants; February, worms and grubs of ants; March, slugs, beetles, and grubs of ants; April, ants and worms; May, red ants and grubs of wasps; June, bees and ants; July, red ants; August, red ants and worms; September, ants and worms; October, grubs of ants; November, grubs of ants and bees; December, ants (Florent Prevost). According to Naumann, the Green Woodpecker feeds at all seasons, chiefly on ants and their pupæ, *Formica rubra, F. fusca, F. nigra*, but seldom on *F. herculeana*. It also finds in the ant-hills the larvæ and pupæ of *Cetonia aurata*, which, with many other ground-beetles, it eats with avidity. It sometimes attacks wasps' nests for the sake of the larvæ (Dresser).

LESSER SPOTTED WOODPECKER.—Small insects (Yarrell).

WRYNECK.—Insects and their larvæ, large quantities of ants, and their eggs (Yarrell).

CREEPER.—Small insects of all sorts (Yarrell).

HOOPOE.—January, worms, grubs, and snails; February, worms, grubs, and snails; March, worms, grubs, and snails; April, worms, grubs, and snails; May, flies, dragon-flies, and grubs of May-fly; June, water- and land-snails, flies, &c.; July, water- and land-snails, flies, and wood-lice; August, water and land-snails, flies, and wood-lice; September, water and land-snails, flies, and wood-lice; October, snails, flies, and spiders; November, snails, flies, and spiders; December, snails, flies, spiders, and worms (Florent Prevost).

NUTHATCH.—Larvæ, insects, nuts, berries, hard seeds, and beechmast (Yarrell).

CUCKOO.—According to Count Casimir Wodzicki, the Cuckoo is most useful in destroying *Bombyx Pini*, eating its eggs and larvæ. In 1847 a pine-forest in Darsin, Pomerania, was threatened with destruction by these larvæ, when it was suddenly saved by a large number of Cuckoos which were on passage, but remained two weeks to enjoy the abundance of food; and in a very short time they so cleared the forest that the pest did not appear the next year. . . . . . According to Mr. Zimmermann, on the island of Elbe, at Leitmeritz, the larvæ of *Liparis chrysorrhœa* appeared in such quantities as almost to prevent the otherwise much visited promenade from being used, when four pairs of Cuckoos began to clear away the larvæ, and remained quite peaceably together (Dresser). Mr. J. H. Gurney, jun., told me of the larva of *Zeuzera Æsculi* being found in the stomach of a Cuckoo. Some which I dissected were full of large hairy larvæ, probably those of *Spilosoma menthrasti* and *S. lubricipeda*. The gizzards of all Cuckoos, both old and young, dissected by me were entirely lined with such a thick layer of the hairs of such larvæ that when the gizzards were turned inside out they resembled the skins of mice. The hairs appeared to be firmly rooted, and all pointing in regular order as if they had been all brushed in one direction by the action of the gizzard. I have known many Cuckoos to frequent gooseberry-bushes in a garden at Aylmerton for several days, and believe they were destroying larvæ (F. Norgate). Old Cuckoos seem most partial to hairy larvæ. Young Cuckoos eat flies, beetles, larvæ, grasshoppers, small snails, tender shoots of grass, young wheat, or vetches (Yarrell). Larvæ of *Pieris brassicæ*, larvæ infesting gooseberry-bushes, and especially hairy larvæ (Stevenson). From July 18th to 22nd forty Cuckoos were seen, chiefly among gooseberry-bushes, in a garden in the county of Down. Almost all permitted a very near approach, but yet not near enough to be caught by hand (Bishop Stanley). A young Cuckoo killed on August 20th contained about twenty full-grown larvæ of *Vanessa Io* (Bishop Stanley). Young Cuckoos seem to have enormous appetites, and to be fed by several different species of birds, besides their own foster-parents (F. Norgate).

ROLLER.—Insects, worms, slugs, and berries (Yarrell).

BEE-EATER.—Takes its food on the wing. Chiefly winged insects, Hymenoptera, bees, Cicadas (Yarrell). One Bee-eater contained the remains of five large hymenopterous insects—humble bees? (Stevenson).

KINGFISHER.—Water-beetles, leeches, minnows, sticklebacks (Yarrell). Water-beetles and *Notonecta* (Stevenson).

SWALLOW. — Insects (Yarrell). Food consists chiefly of *Staphylinus brachypterus* (Bishop Stanley). For some lengthy remarks on the food of the *Hirundinidæ*, see Harting, 'Our Summer Migrants,' pp. 171—174.

House Martin.—Mosquitoes (Yarrell).

Sand Martin.—Gnats, small *Libellulæ*, and other insects (Yarrell).

Swift.—Insects, chiefly *Staphylinus brachypterus*, and spiders (Bishop Stanley).

Needle-tailed Swift.—See 'Zoologist,' 1880, pp. 83, 84.

Nightjar.—Moths, beetles, and fern-chaffers (Yarrell).

Rock Dove.—Grain, seeds, and molluscs, such as *Helix virgata*, *Helix ericitorum*, and *Bulimus acutus* (Yarrell).

Ring Dove.—Turnip-tops, grain, and seedling potatoes; acorns, beechmast, seeds of wild mustard, dock, and rag-weed. It also devours quantities of *Potentilla anserina*, breaking it off in pieces about an inch in length.

Stock Dove.—Much the same food as the last named.

Pheasant.—Wireworms (Stevenson). Insects, ants' eggs, roots of *Ranunculus bulbosus* and *R. ficaria*, acorns, sloes, haws, blackberries, seeds, buckwheat, green leaves, beans, peas, grain (Yarrell). In Hockering Wood the gamekeeper told me the young Pheasants were very fond of eating the insects which are contained in lumps of white froth adhering to the grasses and other herbage —the larvæ of Homoptera (F. Norgate).

Capercailzie.—The young feed principally at first on ants, worms, insects, &c. The old birds feed on the needles and shoots of *Pinus sylvestris*, juniper berries, cranberries, blueberries, and other northern berries (Yarrell).

Black Grouse.—The natural food of the young bird at first is apparently insects only. It is very partial to the larvæ of Homoptera, and to the seeds of the "sprit" or rush. For a long note on the food of both Black and Red Grouse, see Harting, 'The Field,' Feb. 27th, 1875. When reared by hand, the Black Grouse thrives on common house-flies, ants' eggs, and well-scoured maggots.

Partridge.—Insects, ants' eggs, green leaves, and grain (Yarrell).

Red-legged Partridge.—Insects, seeds, grain (Yarrell).

Virginian Colin.—Insects, seeds, berries, and grain (Yarrell). In Norfolk seeds of furze (Harting). In America it feeds on

Hessian-flies, ants, beetles, flies, gnats, moths, grubs, wireworms, pupæ, larvæ, potato-bugs (*i. e.*, Colorado beetle), striped vine-bugs, chinch-bugs, cut-worms (hundreds of chinches found in one bird), locusts, and grasshoppers (Mr. Archer, and the State Entomologist for Missouri). For further interesting particulars, see 'The Field,' Dec. 13th, 1879.

QUAIL.—Insects, green leaves, seeds, and grain (Yarrell). In Ohio the Government stopped Quail-shooting for several years, on account of their great value to farmers as destroyers of grubs and wireworms. See leading article on Game and Game Laws in America ('The Field,' May 1st, 1880, p. 527).

GREAT BUSTARD. — Beetles, mole-crickets, grasshoppers, worms, snails, mice, &c. (Stevenson). Also green corn, grasses, trefoil and other vegetables, and probably reptiles (Yarrell).

NORFOLK PLOVER or THICK-KNEE.—Coleoptera, snails, earwigs, worms, slugs, and frogs (Stevenson). Insects, worms, slugs, Coleoptera of the genus *Carabus* (Yarrell). Beetles and worms (Lubbock).

LITTLE BUSTARD.—Insects, herbs, grain, lungwort, dandelion, grass, and leaves of white turnip (Yarrell).

GOLDEN PLOVER.—Insects, slugs, and worms (Yarrell).

DOTTEREL. — Insects and their larvæ, worms, and slugs. During the breeding season, small Coleoptera (Yarrell).

RINGED PLOVER, KENTISH PLOVER, and LITTLE RINGED PLOVER.—Insects, worms, and small Crustacea, such as shrimps and sandhoppers (Yarrell). The Kentish Plover is believed to feed chiefly on a very active species of spider which is abundant on the beach (H. A. Dombrain, Zool. 1880, p. 138). In the stomach of a Little Ringed Plover shot at Kingsbury Reservoir, Middlesex, Mr. Harting found several small beetles and a single caddis-worm. In the Common Ringed Plover, besides the remains of small beetles and worms, he has also noticed a mass of semi-digested vegetable matter, and invariably some small particles of coarse sand or gravel.

(To be continued.)

ON THE SPRING MIGRATION OF WADERS ALONG THE EAST COAST IN 1881.

By John Cordeaux.

Having during the past spring spent several hours daily on the coast of North-East Lincolnshire and Holderness, at the time the shore-birds were passing northwards, I have been able to take the following notes, which, without further remark, I now give in the order of their occurrence.

With the exception of some rather large flocks of Dunlin, none of our common shore-birds appeared before May 11th, when I saw Curlew, Whimbrel, and Godwit on the Humber foreshore. A pair of the latter feeding near the creek were male and female, the former in full summer plumage, with the under parts very dark red; the female, considerably the larger of the two, had the head and foreneck dashed with rufous, but with this exception, compared with the male, was very light coloured, a greyish yellow predominating. Near the creek end were a pair of Wild Ducks and a Sheldrake. On the 13th Whimbrel were in full force, both on the muds and in the coast marshes. On the 16th there was a strong gale from N.W. to N.: on this day I saw the first Grey Plover, two pairs, the males in full plumage, females less advanced, and the upper parts marbled with yellowish ochre and ash-grey, showing much lighter than the brown-black and white of their partners. I may here add that in every case I make a point of examining the birds through a powerful telescope. With the Grey Plover were some Dunlin in summer dress, and a Ringed Dotterel, the first seen this spring. The Grey Plover were feeding on small red worms, which they extracted, wading slowly, tarsal-joint deep, in the ooze. Hooded Crows were seen near Spurn on the 20th, and on the previous day a party of seven in the adjoining parish to this—an unusually late stay of these marauders. On the 21st, S.E. to S., hot sun and cold wind, nothing but Ringed Dotterel and black-bellied Dunlins on the flats.

During the second week in May flocks of Dotterel (*Eudromias morinellus*) were seen in our south-east marshes, but I was not fortunate in coming across them. A "trip" of about twenty was seen near Spurn about the middle of the month, and near Dimlington another "trip" of about thirty close to the coast. The

Common Sandpiper was very plentiful along the coast-line during the third week in May, and large parties of them frequented for some days the ponds and pools nearest the shore: all had left on the 20th. At Spurn, on the 25th, there were numerous waders, excepting the Dunlin, the Turnstone perhaps exceeding any other; these were, in some cases, in pairs, the male and female readily distinguishable, and also in small flocks, containing birds very much in the same plumage as the young of the year in the autumn, with others more advanced. It was very interesting to watch them foraging for food, tossing to and fro with the greatest rapidity the sea-tangle and tide-wreck. In some cases where the object was too large, the bird, first lifting it up with its bill, would then charge with its breast, and, regularly putting "shoulder to the wheel," roll all over together. The little black-bellied Dunlin feeding in the tidal pools were equally active in the pursuit of food; I frequently noticed them probing sideways all round a stone, so that no small crustacean or annelid concealed beneath could have escaped their nerve-guided touch. The only Sanderlings seen were two or three runnng, as Sanderling only can run, over the sand at the tide-edge, and following the recoil so far that the return wave came within an ace of carrying them away, avoided only by a quick upward spring and short flight. These Sanderlings, although this was the end of May, had no signs of their summer plumage, nor had one or two Knots feeding in company with some Turnstone. Three Whimbrels and two Turnstones in the same pool made a very pretty picture, the latter probing amongst the pebbles for shrimps and sandhoppers, the others on one stiff straight leg, the second tucked up to the belly, and their scythe-like bills hid away under the brown scapulars. Pleasant, too, it was to watch five Lesser Terns, a pair of Dunlins, and a Turnstone, all washing in the same pool and afterwards preening and drying themselves on the sands. Under shelter of the sandhills, with the glass poised in position, it seemed only necessary to stretch out a hand to touch them.

Hot as was the sun-glare on the heated sands, yet a cool and rather brisk sea-breeze swept the dunes, otherwise it would have been no desirable task to walk the seventeen miles I did that day, not, however, without frequent halts, lying on my back amongst waving sea-grass and looking deep into a summer sky crossed with driftings of frailest cirri; then there was the sea ever booming on the pebbles below, and a water horizon round half the circle, unbroken by a sail, but flecked by many a curling crest tossed up by summer breeze. Swallows and Martins flew so low that as I lay I could hear the "swish" and feel the winnow of wings on my face, for the insects were down, and might be taken from the tips of the wind-bowed bents, hovering, as a Kestrel takes a mouse. Sometimes a flock of Dunlin dashed across, just clearing the crest of the sandhills; one flock, specially noted, for they were directly over my nose, had individually the black abdominal patch; yet another flock, which shortly followed, were birds which, excepting the streaky brown necks and upper breasts, had the under parts entirely white. Once four Black Terns, adult birds, flew past; they were following the coast-line towards the north, and subsequently I was told other small parties had been seen moving northwards by the same routes. Common Terns were numerous, and about twenty pairs of the Lesser Tern near the old nesting-quarters; I only succeeded in finding one egg, and that was partly covered with the drift of sand. In some rough cover of coarse grass and sallow-thorn a Short-eared Owl sat so close that I had well nigh trod upon him; off he dashed with a great flutter, beating to windward in an erratic see-saw fashion, the fawn-coloured patches on his wings shining like burnished copper. No doubt, like the Hooded Crows, a very late migrant, delayed from some cause or other—perhaps the uncongenial season—beyond the average date of departure.

How persistently during the whole day did those strange birds, the Cuckoos, hunt the sandhills, which, by the way, like our Humber embankments, are a very favourite beat of theirs; the smaller, the male bird, is quite as assiduous in hunting up the Pipits' nests as is his partner of the time; from long watching I conclude that he, too, hunts for nests, and possibly guides the female to them. These sandhills swarm with Pipits; one nest was cleverly concealed under a bunch of grass, the other end of which was weighed down by a drift of sand, and under this self-formed arch was the cosy grass-lined nest and five brown-grey eggs. The Ringed Plover, several pairs of which nest in this locality, kept up a perpetual plaintive whistle as they hurried to and fro, and the creaking cries of the Terns, distressed at the invasion of their dominions, might be heard long after the cause of their trouble had passed on his way. Beautiful little wanderer over the tossing sea-wave! as we watch thy flight and mark thy perfect form, as if carved from the purest ivory, we are thankful that one of the most humane Acts ever passed by any Government, Whig or Tory, protects thy slight and sylph-like form from the pitiless and ever-destroying Philistine! Long mayst thou return to gladden our eyes in the pleasant spring time, and find a summer home on our shores!

A pair or two of Sheldrakes breed not far from this part of the coast, fortunately on protected ground; and I was told of two pairs of Pintails which had remained late on April in a private pond.

In the storm-beaten hedges on the cliffs, which, having small chance of growing upwards, expend all their energy in spreading landwards, were numerous small birds, the most frequent of which were the Common Bunting and Sedge Warbler. I also, amongst others, heard the Lesser Whitethroat—far less numerous than the common species, yet regularly occurring as a nester, and also passing through the district in some numbers, both in the spring and autumn. Subsequently, in Buckinghamshire, where it appears to be very common, I became thoroughly familiar with this little warbler. It haunts much the tops of high elms, and on sultry days its pleasing but somewhat monotonous song may be heard from early dawn till late in the day. I never heard it in the beech-woods, but everywhere else in tall and isolated clumps of trees and garden shrubberies.

On May 27th the Grey Plover mustered in some numbers on the Humber foreshore, with black-bellied Dunlin and a flock of the pretty small race of Ringed Plover, the *Charadrius intermedius* of Ménétriés. On June 1st, an intensely hot day, with the thermometer 95° in the sun, there were seven Grey Plover and three Turnstones together near our sea-creek; of the former, one was a perfect old male in full plumage, five others were less advanced, and the last was in sober grey, with the under parts white, and showing no trace of any change to summer plumage; the Turnstones were in an advanced but not perfect plumage. This was the last of them, but on the 16th of June, near the same place, was a Whimbrel all alone on the steaming flat, and, as far as glass could search the foreshores of our muddy river, nothing else save a score or so of the Brown-headed Gull.

ORNITHOLOGICAL NOTES FROM THE NEIGHBOURHOOD OF CROMER.

By J. H. Gurney, Jun., F.Z.S.

In my last communications on Cromer Ornithology I remarked that none of the Rough-legged Buzzards which occurred so numerously during the winter were adult birds, but some time after writing I saw a splendid adult "Rough-leg" at Mr. Dack's, the birdstuffer at Holt, which had been shot at Thornage as late as the first week in March.

March 18th seems a late date for fifteen Tufted Ducks to be on Ranworth Broad, as they have never been ascertained to breed in the east of the county; yet such was the case, and they appeared from their brown colour to be all females. It was late also for an adult pair of Goldeneyes and a flock of Wigeon, though not for a fine drake Shoveller. In addition to these ducks there were swimming about no less than twelve Great Crested Grebes in different states of plumage; and mooring my boat for a ramble on the marsh I saw a Peregrine Tiercel and a Marsh Harrier, the latter no longer the *genius loci*, as our old naturalists once termed him. I saw another on May 3rd at Barton. On March 29th there were again a great number of ducks of different kinds at Ranworth, but too shy for my accurate identification; and the flock of Great Crested Grebes appeared to have wholly attained the breeding garb. On April 22nd there was only one Grebe to be seen on the Broad; but three nests were in process of building, and would probably have contained eggs if it had not been for the east wind, which, according to the broad-man, had upset the nests when they were nearly ready. On the 26th, after four days' fine weather, Mr. R. B. Sharpe, who was on a visit to Norfolk in connection with the Fisheries Exhibition, found two eggs in one of these nests. I believe there is no time like the spring for observing these Grebes; for in the summer they conceal themselves with such cunning, that it is almost impossible to see them, although I observed five on one occasion on Ranworth Broad in May, and five on another on Hoveton Broad in July.

On April 23rd I accompanied my friend Mr. Norgate in a raid on some Carrion Crows' nests. The line of country between

Aylsham and Dereham is one of the fen districts in Norfolk where the Carrion Crow still breeds, and ere long Foxley Wood (to which, under Mr. Norgate's guidance, we directed our footsteps, and which is their great stronghold) is to be preserved, and the days of these plunderers of Pheasants' eggs will be numbered in that locality. Mr. Norgate showed me six nests in Foxley Wood, and seven or eight in tall grey poplars in meadows at Holbecks. We did not get up to all of these nests, but took three clutches of three eggs each. I was surprised to see how very cup-shaped the nests were, and all thickly lined with sheep's wool, and occasionally horse's felt and hare's fur, the nest itself being generally made of oak twigs and branchlets in Foxley Wood, where there is nothing but oaks; and of poplar, alder, and ash in the meadows, with a little maple and whitethorn. Some years ago Mr. Norgate found a path in Foxley Wood strewn with Pheasants' egg-shells, exactly as if boys had been running a paper chase and scattering shells instead of paper. These eggs, he believed, had been all sucked by Crows.

The Magpie is almost as much to blame, and I am sorry to say we had to sacrifice one of a fine pair at Northrepps which had been with us all the winter. Notwithstanding this the survivor paired again and brought off young ones, and on June 26th I saw six at one time in our "wall cover"—an unprecedented occurrence. On May 11th, there were many Turnstones at Cley, near Cromer; in one flock twenty-seven, some of which were in perfect plumage, others not so good; plenty of Whimbrel, true to their name of "May-bird" and mostly in pairs, and a pair of Shelducks; but no red Godwits, though this is about the date when they pass up the coast of Norfolk on their spring passage.

Nearly all our spring migrants arrived about the usual time. None were particularly early, but this year for the first time I did not remark the departure of the Hooded Crows in March. A few Kestrels and a good many Ring Doves appeared at Cromer, and the latter did some harm to the newly-sown wheat. No sooner is it sprinkled on the fields than they find it out, and by far the most damage is done in the first day or two. Of all omnivorous birds commend me to the Wood Pigeon. The food of this bird in the early part of March consists of beechmast, acorns, leaves of leguminous plants, ivy-berries, and peas. I have arranged them somewhat in order of abundance as I have found them in a good many which I have shot and opened; but beechmast and acorns are the favourite diet. In April they attack the young wheat before it has begun to sprout. Their voracity is only equalled by the capacity of their crops. A Wood Pigeon's crop will contain from twenty to thirty acorns, or 100 beechmast or 500 ivy-berries, and then not be full. When satisfied they retire to some thick silver-firs to sleep, but the slightest rustling of a footstep, or the snapping of a branch, is enough to frighten them. They find both acorns and beechmast palatable enough long after they have begun to germinate, and I consider them much better for the table on such diet than when feeding on turnip-tops. With frost and snow they always leave Cromer. This bird is generally accredited with yellow eyes, but I have seen them both slate-coloured and white, the latter in the young bird. The birdstuffer at Holt has a Wood Pigeon with a crest three-quarters of an inch high. It was shot by the son of a gamekeeper near here, and has this abnormal growth on the back of its head. It may possibly be the result of an old shot-wound.

OCCASIONAL NOTES.

On the former existence of the Bear and Wolf in Cornwall.— I venture to add to your very interesting abstract of one of the "Davis Lectures," published in the last number of 'The Zoologist,' a few suggestions as to the past Natural History of Cornwall. So far as I know, nothing has been discovered which makes certain the existence at any time of any sort of Bear (Badger of course excepted) in Cornwall; but in the Cornish language the word "Ors" is rendered "Bear," and in one of the oldest, if not the very oldest, existing records of the old Cornish tongue occurs the entry "Ursus = Ors = Bear" (see Norris's Vocabulary, and Borlase's 'Antiquities of Cornwall'). As a general rule, it is held that if the old Cornish language produces a word evidently based upon a Latin derivative (*pons* = a bridge, for instance) it represents something introduced, or at least renamed, by the Romano-Britons; and these are people who, however hazy the account of them may be, are within the limits of historical time, and consequently the fact that the Roman "Ursus" appears in Old Cornish as "Ors," meaning a Bear (Borlase says it means a he-bear), points to the conclusion that the Bear was existent in Cornwall long after the commencement of the Christian era. Our moorlands must have been then so vast in proportion to the size of our county (and may be, then, our forests also) that the Bear frequenting them may have been an unknown animal to the people of extreme West Cornwall, who alone ever spoke the pure Cornish tongue until an invading (may be friendly) force brought them the news of the existence of the animal, and named it. I do not suppose that this theory of mine would, if supported by proof, bring the existence of the Bear in Cornwall much later than the third century of the Christian era; but it is supported by facts enough to show that an animal named with the equivalent of the modern word "Bear" was known in Cornwall within historic times. There is a local tradition prevalent in this district that very early in the eighteenth century an old dog-wolf infested a rocky hill called Trencrom, about six miles from Penzance; that, after many hunts, he was one day chased thence to a thicket close by the railway on the north side east of Marazion Station, and now known as Darlington Burrows, and there killed; and that this was the last Wolf killed in Cornwall. I do not put much reliance on the date of the tradition, but I suppose that the existence of it shows that Wolves were extant in Cornwall to within a recent historical period. It it unsafe to rely on the word "Wolf" occurring in names of places as indicating the former existence of the animal in places so named. The Wolf Rock on which the lighthouse is built, nine miles out at sea off the Land's End, can have no connection whatever with the animal "Wolf," but has a direct and distinct connection with the name of some hardy Norseman, "Olaff," who was once lost there, or who perhaps may have discovered it.—THOMAS CORNISH (Penzance).

ON THE YOUNG OF THE PINE MARTEN.—I received two young Pine Martens from Cumberland on June 13th, and think the following points are worth recording. They were said to have been caught by a shepherd "in a brossen-rock" (of which word I should be glad to receive an explanation). "The shepherd's dog found them, and he got them out of the crevice of the rock with his stick." There were only these two in the litter. With the exception of Bell (1st and 2nd edit.), who says, "The number of young ones at a birth is stated to be usually but two or three," the minimum, according to the few authors I have consulted who give numbers, is variously stated as three or four, while the maximum ranges between four and eight! In 'The Zoologist' for 1879 Mr. C. A. Parker, writing of Cumberland, says (p. 171) the young "are born about the end of April or beginning of May, and are two or three (never more) in number"; and again (p. 264), "on April 12th a female Marten was killed . . . . and two young ones found, still blind, one being considerably larger than the other." On July 2nd I measured one of my cubs (there is no perceptible difference between the size of the two), with the following result, which is about as accurate as it is practicable to get with a wriggling, fidgetting live animal:—

Length of head, 4 in.; of neck and body, 11⅝ in.; of tail (including hair-point), 8 in. They had, I think, increased nearly two inches in total length in the nineteen days between their arrival and the date of taking the measurement, of which increase fully an inch belongs to the tail. Those of the authors I have looked up who assign a date for the time of birth of the young, give April or May; but I should think from their size that these cubs must have been born three months, which brings the time to the beginning of April or the end of March, though of course it is impossible to speak positively without considerable experience with the young of the species, and the rate of growth would also depend largely on the feed. This date, however, agrees with that in the instance recorded by Mr. Parker, as the young would no doubt be blind for at least four weeks. On July 5th I found that both cubs had got their permanent incisors in the upper jaw; one has cut both upper permanent canines; the other cub has one upper canine just showing through the gum. Both cubs retain their four milk canines. The remaining teeth in the upper jaw, and all the lower jaw, are of the deciduous set. Both the cubs are males.—ALFRED HENEAGE COCKS (Great Marlow, Bucks).

SOOTY SHEARWATER OBTAINED IN IRELAND.—Through the good offices of my friend Mr. J. C. Neligan, of Tralee, I have lately had the opportunity of examining a specimen of the Sooty Shearwater (*Puffinus griseus*, Gmel.), which was killed many years ago off the Little Skellig rock, on the coast of Kerry, and has since been preserved in the collection of Mr. R. B. Chute, of Chute Hall, to whom I feel much indebted for his kindness in allowing this valuable specimen to be brought to Dublin. This is the bird which was first described as British by Mr. Arthur Strickland, in 1832, under the name of *Puffinus fuliginosus*, from a specimen shot at the mouth of the Tees; and which has been treated as the young or female of the Great Shearwater (*P. major*, Faber) by many of our best authorities. But, in his 'Birds of Europe,' Mr. Dresser identifies it with *P. griseus* of Gmelin, and considers it a species distinct from *P. major*. Though both birds are rare on the British coasts, *P. griseus* appears to be much the scarcer of the two, and has not hitherto been recorded as Irish.—A. G. MORE (Museum of Science and Art, Dublin).

ON THE REPORTED OCCURRENCE IN ENGLAND OF THE AMERICAN PIED-BILLED GREBE.—At a meeting of the Zoological Society on the 21st June last, Mr. R. B. Sharpe exhibited a specimen of *Podilymbus podiceps*, stated to have been killed at Radipole, near Weymouth, in the winter of 1880-81. Such an occurrence is highly improbable, not only from what is known of the habits of this bird,—which, although common in North, Central, and some parts of South America, has never, so far as I am aware, been met with in Europe,—but also because the appearance of the specimen exhibited seemed to preclude the possibility of its having reached this country otherwise than in a preserved state. It is a young bird, with traces of the longitudinal dark stripes on the neck, which are observable in the young of all the Grebes. The birdstuffer from whom Mr. Sharpe received it must have made some mistake in supposing that it was killed near Weymouth, perhaps confounding it with the young of one of our British Grebes in a similar state of plumage which may have been sent to him from that neighbourhood. It is desirable that this should be noted, lest hereafter, in consequence of the published report of the exhibition of the specimen in question, there may be supposed to be grounds (which, in my opinion, do not exist) for regarding this species as an accidental wanderer to Europe.—J. E. Harting.

The Food of Blackbirds.—Do Blackbirds eat slugs? Most casual observers of Natural History will answer "yes." But I ask, "Has any one positive evidence that slugs (by which I mean the soft, small white slugs so destructive in gardens) form part of the ordinary food of Blackbirds? On the other hand, trustworthy observers have told me that they are convinced that neither Blackbirds nor any other birds, except Ducks, will eat slugs. We know for certain that both Blackbirds and Thrushes at the beginning of winter feed eagerly upon shell-snails, and these are always mentioned amongst the ordinary food of these birds; but that veteran and trustworthy observer, the Rev. L. Jenyns, in his 'Manual of Vertebrate Animals,' does not include slugs amongst their food, though the destruction of slugs is mentioned incidentally amongst the merits of Blackbirds in the old edition of Yarrell's 'British Birds,' and I believe this is repeated in the new edition now in the course of publication. One is apt to take such things for granted, and to suppose that the hundreds of Blackbirds and Thrushes found feeding under the leaves in wet turnip-fields, during September and October, must be looking for slugs; but when we are told on good authority that Blackbirds and Thrushes in confinement will not, though hungry, touch slugs, and they have been frequently observed to pass them over when feeding on lawns, and that common fowls avoid slugs, we are led to suppose that there may be something in them repugnant to the taste of most birds.— C. Wolley-Dod (Edge Hall, Malpas, Cheshire).

Encounter between Sparrow and Mouse.—While the festivities in connection with the friendly societies were in progress at East Dereham, Norfolk, on June 7th, a curious scene was witnessed by some bystanders, awaiting the passing of one of the processions near the King's Head Hotel. Their attention was attracted by seeing a sparrow in full flight from a neighbouring housetop, bearing in its mouth something almost as large as itself. On reaching the ground, this proved to be a live mouse, which, in the course of a hard struggle, managed to release itself from the clutches of the bird, and a regular encounter at once commenced between the two, victory finally falling to the lot of the sparrow, and the poor mouse was apparently lifeless. This sparrow, however, was not permitted to carry off his spoil, if such was his intention, for some passers-by unconsciously put it to flight, and it mounted to its former place on the housetop. Here it surveyed its late antagonist, with an evident desire to renew the combat, and give the necessary *coup de grace.* This, however, it was not permitted to do, owing to the interruption of persons going to and fro. The mouse was either dissembling death, or was too much exhausted to move, for it remained quite motionless for some time. Finding it was left unmolested, it gradually recovered courage, commenced slowly to move, and finally beat a hasty retreat. It is supposed it was found by the sparrow in its nest, and that the above summary mode of eviction was resorted to.—'*Eastern Daily Press,*' *June 9th.* (Communicated by Mr. J. H. Gurney.)

SHORT-EARED OWL BREEDING IN CAMBRIDGESHIRE.—One day at the very end of June last, I was fortunate enough to discover a fine young Short-eared Owl, while crossing Wicken Fen, between Ely and Cambridge. It was of sufficient age to have left its nest, which I could not find, the sedge around being of a considerable height. When I went to touch it, it commenced a great hissing, accompanied by much snapping of the bill, and afterwards turned upon its back, going to work upon my hands with both bill and claws. Soon after I twice saw one of the old birds sailing about over the Fen, sometimes giving a curious subdued kind of bark. From Prof. Newton's remarks in his edition of Yarrell, it seems that the last nest he heard of in the East of England was at Littleport, in the Isle of Ely in 1864.—ROBERT M. CHRISTY (Saffron Walden).

OCCURRENCE OF THE BLACKCAP IN CO. DONEGAL.—On the 21st of May last, I listened for some time to the song of the Blackcap, *Sylvia atricapilla*, amongst trees around Mr. Batt's garden at Rathmullan House, upon the west shore of Lough Swilly. This warbler has not been previously noticed in Donegal. I have already recorded the appearance of the Wood Warbler in the same neighbourhood (Zool. 1878, p. 348). In the bleaker parts of the county, as at Carrablagh in Fenet, north of Rathmullan, other warblers, the Chiffchaff and the Willow Wren, appear early in the season more plentifully than they do later on, no doubt on their way to a more sheltered habitat, although a fair proportion of the latter remain to breed. The first-mentioned two are probably upon a similar passage.—H. CHICHESTER HART (71, St. Stephen's Green, Dublin).

TREE PIPIT EJECTING CUCKOO'S EGG FROM ITS NEST.—On June 16th a case came under my notice of a Tree Pipit refusing to undertake the charge of a Cuckoo's egg. My informant saw the Tree Pipit shovel the

Cuckoo's egg out of her nest with her bill, and early next morning he replaced it. When he took me to the nest a few hours afterwards we found the egg again turned out, the Cuckoo having laid another in the nest, which was now forsaken by the Tree Pipit. The nest, with the two Cuckoo's and three Tree Pipit's eggs, is now in my possession.—BRYAN HOOK (Farnham).

COMMON BUZZARD NEAR CROYDON.—On July 8th a male Buzzard was shot at Sanderstead, near Croydon, by Mr. Bridge's keeper. It seems strange that one should be in this neighbourhood at this season of the year.—PHILIP CROWLEY (Croydon).

KESTRELS NESTING IN HOLES IN TREES.—I have seen in Surrey this summer two Kestrel's nests in holes in trees, which is not a very usual site. One was about two feet down in an elm, the other about one foot down in an ash.—J. H. GURNEY, JUN. (Northrepps, Norwich).

[In the summer of 1876 a pair of Kestrels nested in the hollow of an old pollard at Bromley, Kent. The nest was not more than ten feet from the ground, and contained six eggs, four of which were taken, and the remaining two in due course hatched.—ED.]

WATER NEWTS IN THE CO. CORK.—Water Newts, *Lissotriton punctatus*, Bell, are to be seen in a pond near the village of Currieglass, in the County Cork, and have been seen in two or three other places near the pond. In Thompson's 'Natural History of Ireland,' it is stated that no species of Newt has been found in the Counties of Cork or Kerry.—CHARLES LONGFIELD (Church Hill, Desertserges, Bandon).

BASKING SHARK IN TORQUAY HARBOUR.—On the evening of June 21st a Shark was observed swimming about the inner harbour of Torquay, and after an exciting chase was at length gaffed and hauled into a boat. It proved to be a specimen of the Basking Shark, *Squalus maximus*, weighing about three hundredweight, and measured eight feet four inches in length and three feet eight inches round the body. The late Dr. J. E. Gray has the following statement, in his description of the genus:—"Scales with small curved points bent in all directions, so that the skin feels rough each way." But Dr. Fleming says that the Basking Shark is smooth when the hand is passed from head to tail. I have found by experiment on the Torquay specimen that Dr. Fleming was quite correct. Couch remarks that "the food of this fish is not known." According to an Orkney newspaper which he quotes, the Basking Shark does not object to "a mouthful of herrings." The captor of the Torquay specimen informed me that he found in its stomach a John Dory; the skin was gone, but there was no difficulty in the identification. The Torquay specimen was very small and no doubt immature, for according to the Orkney paper already mentioned a specimen was taken near Whalsey, one of the Shetland Isles, 27·5 feet long and 16 feet thick. The liver yielded 165 gallons of oil, which was sold for £16 10s. Yarrell saw at Brighton a Basking Shark 36 feet long. One was taken in Cornwall that measured 31 feet 8 inches; and Lacepède speaks of one 33 feet in length and 24 feet in circumference. The Shark is valuable on account of the oil obtained from its liver. Fleming says the liver of a full-sized fish yields from eight to twelve barrels of oil; that of the Cornish specimen above referred to produced 198 gallons. Two examples at Broadhaven, in Scotland, yielded about nineteen barrels, of which eight make a ton. Judging from the Torquay specimen now under notice, Couch's figure of the tail is incorrect; he makes the length of the larger lobe bear to that of the smaller the ratio of 4 to 2, whereas it should be 4 to 3.—W. Pengelly (Torquay).

Remora, or Sucking-fish, off the Cornish Coast.—On July 14th a Porbeagle Shark, nine feet long, was taken on a mackerel line, about twelve miles south of Deadmans, by the fishing-boat 'Willie,' Rolling, master. Mr. Dunn informs me that, on going on board the boat on its arrival at Mevagissey, he inquired of the men if they had seen anything of a little black fish clinging on to the Shark? One of them declared he had, and had thrown it into the sea. However, on Mr. Dunn looking in the boat, near the tail of the Shark, he discovered a *Remora*, which he kindly sent to me. It is 4¼ inches in length, and in excellent preservation. The number of recorded instances in which British examples of the *Echeneis remora* have been captured are few. Turton states that he obtained one in 1806 at Swansea from the back of a cod-fish. In July, 1848, one was taken at Clontarf, Dublin Bay, adhering to the gills of a Blue Shark; and, in 1867, Mr. Dunn obtained the first specimen taken in England, also from a Blue Shark, about six miles distant from where the present one was captured.—Francis Day (Pittville, Cheltenham).

Rare Fishes on the Cornish Coast.—On June 21st I received, from Mr. Dunn, of Mevagissey, in Cornwall, a small specimen of Maigre, *Sciæna aquila*, 23 in. in length, which had been captured the previous day in a trammel. He observed that these fishes arrive off the Cornish coast about the spring of the year, in company with the Bass, *Labrax lupus*, which at this season are feeding on the young of the Herring, Sprats, and other fishes, and it therefore seems a fair presumption that they indulge in similar food. Externally, and in colour, the two forms somewhat resemble one another, and it is not improbable that many Maigre may haxe been captured, but overlooked. On June 2nd Mr. Dunn likewise forwarded to me a beautiful example of Couch's "Dotted Mackerel," a variety in colour of the common form. It was 10¼ in. in length, and a female, in which the ova were not quite ripe for shedding. With it he also sent one of Couch's "Scribbled Mackerel," another variety in colour of the common form, and which Couch considered to be a distinct species, a conclusion I expressed a doubt upon in my 'Fishes of Great Britain and Ireland,' p. 85. Without entering into details in this place, I may mention that the only difference between *Scomber scriptus* and *Scomber scomber* is one of colour, it being merely a variety as respects its markings. On June 2nd Mr. Dunn also informed me that a Spinous Shark, *Echinorhinus spinosus*, had been taken sixteen miles off Deadmans, on a line with mackerel bait. When hooked it was swimming at the sea bottom. Although this fish is not a common visitor to our shores, still it cannot be considered as very rare. One was taken prior to 1828 on the Yorkshire coast; in the summer of 1830 one was taken in Filey Bay, Yorkshire; in July, the same year, another near Land's End; in 1837 a third was trawled off Brixham; early in November, 1838, one was caught on a line off Berry Head; and December, 1849, another in a trawl net off Falmouth Harbour. In 1851 a dead one was cast ashore at Gamrie, in the Moray Firth. Besides the foregoing, the following have been recorded:—December, 1865, a male, 6 ft. 2 in. long; September 7th, 1870, one, 8 ft. 3 in. long; May, 1875, one, 5 ft. 1 in. long; and January, 1877, a fourth, 8 ft. long, all reported by Mr. Cornish from Mount's Bay. In 1869 one was captured off the mouth of the Tyne, and a female, about 6 ft. long, at or near the same spot, in a salmon-net in July, 1876, and which is now in the Newcastle Museum. In 1874 Turner recorded one from the Bass Rock, and Mr. Gatcombe likewise, in January, 1877, observed an example, 6½ ft. long, taken off Plymouth, while it has been also taken at Brixham. The foregoing instances, to which several more might be added, show that this fish may be present at any period of the year: that it is mostly captured by baits while it swims near the bottom, being, in fact, a ground Shark. However, before concluding these obvervations, I wish to remark on some beautiful Gurnards shown me by Mr. Carrington at the Westminster Aquarium, and which had recently been received from the south coast. The size of the young of the sapphirines varied, but the inner side of the pectoral fins in all were of a lovely light, almost emerald-green, tinted with blue, while in the smaller ones the pectoral blotch was of a dark purple with milk-white spots; as the size of the fish increases this blotch by degrees disappears, as may be distinctly observed in the beautiful living series. There were also some fine examples of the Elleck, or "Cuckoo Gurnard," the body of each being transversely marked with four wide dark bands wider than the red ground colour. On July 2nd Mr. Dunn sent me another variety of the common Mackerel, *Scomber scomber*, captured that day, and called by the fishermen "a Mackerel without markings," being the second landed at Mevagissey this season. When first seen, Mr. Dunn observes that it had twenty-five oblique dark lines (very indistinct) above the lateral line. On arrival at Cheltenham these lines were hardly visible. The example was 14½ inches in length, in pretty good condition, a female which had spawned, and in which no air-bladder existed. It is very interesting as demonstrating that not only may the black markings be variously altered, as in the dotted and scribbled forms, but even be entirely wanting, as observable in this specimen.—FRANCIS DAY (Pittville, Cheltenham).

ERRATUM.—In my notice of the National Fisheries Exhibition lately held at Norwich, 'Zoologist' for June last, p. 251, fourth line from the bottom, for "Fakenham," read "Lakenham."—T. SOUTHWELL.

SIR JOHN LUBBOCK ON THE HABITS OF ANTS.—At the meeting of the Linnean Society on June 2nd Sir John Lubbock read a further paper on this subject. He said that in one of his former essays (Linn. Soc. Journ., vol. xiv., p. 278) he had given a series of experiments made on Ants with light of different colours, in order, if possible, to determine whether Ants had the power of distinguishing colours. For this purpose he utilised the dread which Ants, when on their nest, have of light. Not unnaturally, if a nest is uncovered, they think they are being attacked, and hasten to carry their young away to a darker, and as they suppose a safer, place. He satisfied himself, by hundreds of experiments, that if he exposed to light most of a nest, but left any part of it covered over, the young would certainly be conveyed to the darker portion. In this manner he satisfied himself that the different rays of the spectrum act on them in a different manner from that in which they affect us; for instance, that Ants are specially sensitive to the violet rays. But he was anxious to go beyond this, and to attempt to determine how far their limits of vision agree with ours. We all know that if a ray of white light is passed through a prism, it is broken up into a beautiful band of colours—the spectrum. To our eyes it is bounded by red at the one end and violet at the other, the edge being sharply marked at the red end, but less abruptly at the violet. But a ray of light contains, besides the rays visible to our eyes, others which are called, though not with absolute correctness, "heat rays" and "chemical rays." These, so far from being bounded by the limits of our vision, extend far beyond it—the heat rays at the red, the chemical rays at the violet end. He wished, under these circumstances to determine, if possible, whether the limits of vision in the case of ants was the same as with us. This interesting problem he endeavoured to solve as follows:—If an Ants' nest be disturbed, the Ants soon carry their grubs and chrysalises under-ground again to a place of safety. Sir John, availing himself of this habit, placed some Ants with larvæ and pupæ between two plates of glass about one-eighth of an inch apart, a distance which leaves just room enough for the Ants to move about freely. He found that if he covered over part of the glass with any opaque substance the young were always carried into the part thus darkened. He then tried placing over the nest different coloured glasses, and found that if he placed side by side a pale yellow glass and one of deep violet, the young were always carried under the former, showing that though the light yellow was much more transparent to our eyes it was, on the contrary, much less so to the Ants. So far he had gone in experiments already recorded. But he now wished, as already mentioned, to go further, and test the effect upon them of the ultra violet rays, which to us are invisible. For this purpose, among other experiments, he used sulphate of quinine and bisulphide of carbon, both of which transmit all the visible rays, and are therefore perfectly colourless and transparent to us, but which completely stop the ultra violet rays. Over a part of his nest he placed flat-sided bottles containing the above-mentioned fluids, and over another part a piece of dark violet glass; in every case the larvæ were carried under the transparent liquids and not under the violet glass. Again, he threw a spectrum into a similar nest, and found that if the Ants had to choose between placing their young in the ultra violet rays or in the red, they preferred the latter. He infers therefore that the Ants perceive the ultra violet rays which to our eyes are quite invisible. Now, as every ray of homogeneous light which we can perceive at all appears to us a distinct colour, it seems probable that these ultra violet rays must make themselves apparent to the Ants as a distinct and separate colour (of which we can form no idea), but as unlike the rest as red is from yellow or green from violet. The question also arises whether white light to these insects would differ from our white light in containing this additional colour. At any rate, as few of the colours in nature are pure colours, but almost all arise from the combination of rays of different wave-lengths, and as in such cases the visible resultant would be composed not only of the rays which we see, but of these and the ultra violet, it would appear that the colours of objects and the general aspect of nature must present to them a very different appearance from what it does to us. Similar experiments which Sir John also made with some of the lower Crustacea points to the same conclusion, but the account of these he reserved to a future occasion. He then proceeded to describe some experiments made on the sense of direction possessed by Ants, but it would not be easy to make these intelligible without figures. After detailing some further experiments on the power of recognising friends, he gave some facts which appear to show that Ants by selection of food can produce either a queen or a worker at will from a given egg. Lastly, he stated that he had still some Ants which he had commenced to observe in 1874, and which are still living and in perfect health; they now therefore must be more than seven years old, being by far the oldest insects on record.

Dwarf Swimming Crab at Penzance.—After waiting for it many years, I have at length obtained a specimen of the Dwarf Swimming Crab, *Portunus pusillus*. I do not know, nor shall I be able to discover, where it came from, but as I found it on my doorstep in the heart of Penzance, I may assume that it probably came from Mount's Bay. It is a large specimen, but I do not give measurements because, having been flattened by the pressure of some heavy substance, probably a fishwoman's "cowel" or basket, it looks larger than it was in life. It is unfortunately unfit for preservation, but not by any means damaged beyond identification.—Thos. Cornish (Penzance).

Development of the Ctenophora.—In accordance with his usual practice of making his anniversary address an exposition of recent progress in some department of zoological research, the President (Prof. Allman), at the meeting of the Linnean Society on May 24th last, selected as his subject the advances which during late years had been made in our knowledge of the development of the Ctenophora, those gelatinous transparent organisms which swim by means of rows of cilia, mostly disposed in comb-like plates, or ctenophores. He referred especially to the beautiful researches of Alexander Agassiz, and to those of Fol, Kowalewsky, and most recently of Chun. He pointed out the phenomenon to which he was himself the first to call attention, that immediately after the earliest stages of the egg-cleavage a remarkable peculiarity shows itself, in the fact that the cleavage is no longer uniform, but takes place more energetically in certain cleavage spheres than in other, whereby the former are broken up into a multitude of small cells which gradually envelop the latter, thus giving us at this early period of embryonic development the foundation of the two germinal leaflets, ectoderm and endoderm. He showed how the body thus formed becomes excavated by an external cavity which soon communicates by an orifice with the exterior, thus presenting, as shown especially by the researches of Chun, the condition of a *gastrula;* how the gastrula-mouth becomes afterwards closed by the continued extension over it of the ectoderm; how a new orifice, the permanent Ctenophore-mouth makes its appearance at the opposite hole, the ectoderm here becoming invaginated so as to form the permanent stomach which opens into the central cavity, which becomes the "funnel" from which spring all the vessels which are destined to distribute the nutritive fluid through the body: how in the spot formerly occupied by the gastrula-mouth certain cells of the ectoderm become differentiated so as to form the rudimental nervous system; and how the great vascular trunks are formed by the differentiation of portions of the endoderm, into which offsets extend from the central cavity. Prof. Allman further referred to the facts connected with the metamorphoses which the larvæ of the Ctenophora undergo between the moment of leaving the egg and the attainment of the mature form—facts for which we are mainly indebted to the researches of Alexander Agassiz and of Chun. He showed how the lobed section of the Ctenophora, as proved by the investigations of A. Agassiz on *Bolina*, and by those of Chun on *Eucharis*, are at first quite destitute of the "lobes" which constitute so characteristic a feature in the adult; and how the young Ctenophore has at this time all the characters of the more simply constructed Cydipidæ, *Eucharis* being also compressed like a *Mertensia* in the direction of the stomach-axis, while in the adult the compression of the body is at right angles to this; how the lobes afterwards grow out laterally from the oval side of the body; how the meridional vessels at first ending in blind extremities extend themselves into the rudimental lobes, and there form the anastomoses and rich convolutions which become so striking in the adult, the stomach-vessels finally entering into the anastomoses. He also referred to Chun's remarkable discovery of the sexually mature condition of the very early larva of *Eucharis*, from which was reared a young brood which returned to the larvæ form from which it originated. Chun's observations on the metamorphoses of the Venus's-girdle (*Cestum veneris*) were also dwelt on. It was shown how the young *Cestum* had a nearly globular form and possessed all the essential features of the Cydipidæ, so that notwithstanding the extremely aberrant characters of the adult the young may be taken as affording a type of the gastro-vascular system with the distribution of the vessels in the Ctenopora generally. The gradual extension of the Cydippe-like larvæ in the direction of the funnel-plane changes it into the long flattened, band-like form of the adult, and brings about (with modifications in the number and direction of the swimming-plates, and the substitution of new tentacles to replace those of the larva which had disappeared) the singularly aberrant course of the vessels characteristic of the mature Venus's-girdle.

THE LATE PROFESSOR ROLLESTON, M.D., F.R.S.—The report of the death at Oxford of Professor Rolleston, in June last, came too late for notice in the July number of this journal; and although by the time these lines are in the hands of our readers the intelligence will have long before reached them, we nevertheless do not hesitate to refer to it, not by way of news, but in order to pay a humble tribute to the memory of a distinguished zoologist. As Linacre Professor of Anatomy and Physiology at Oxford, Professor Rolleston was widely known and deservedly respected, while to all students of the science which he taught his name is of course familiar as that of the author of 'Forms of Animal Life,' a work which has been commended by a high authority as "one of the earliest and most complete examples of instruction by the study of a series of types now becoming so general." Educated at Pembroke College, he took a First Class in Classics in 1850, and was elected a Fellow of his College in 1851; and after studying Medicine for some time at St. Bartholomew's Hospital, returned to Oxford on his appointment as Lee's Reader in Anatomy at Christchurch. In 1860 he was elected to the Linacre Professorship above referred to, a post which he continued to fill at the time of his death. With extraordinary mental acquirements and great energy, Dr. Rolleston not only never shirked, but continually courted, hard work, and it is to be feared that the close and continuous application which appeared to him to be a necessity must have contributed in no slight degree to the ailments which resulted in his death. His loss will be deplored not only by a wide circle of friends and acquaintances by whom he was deservedly esteemed, but also by that section of the general public who, knowing him only by his published writings, had long learned to regard him as a thoroughly reliable guide and instructor in the sciences of which he was Professor. In addition to his 'Forms of Animal Life,' which appeared in 1870 (a new edition of which, we believe, was in preparation at the time of his death), he published several valuable papers in the Proceedings and Transactions of Scientific Societies and other journals. Amongst these may be mentioned a paper "On the Affinities of the Brain of the Orang-Utang" (Nat. Hist. Review, 1861); "Remarks on the Value of the Placental System of Classification" (Trans. Zool. Soc., 1866); "On the domestic Cats of Ancient and Modern Times" (Journ. Anatomy, 1868); "On the homologies of certain muscles connected with the shoulder-joint" (Trans. Linn. Soc., 1870); "On the development of the Enamel in the Teeth of Mammals" (Quart. Journ. Microsc. Soc., 1872); "On the domestic Pig in Prehistoric Times" (Trans. Linn. Soc., 1877); and "On the Modifications of the External Aspects of Organic Nature, produced by Man's interference" (Journ. Geogr. Soc., 1879).

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

Zoological Society of London.

June 7, 1881.—Prof. H. W. Flower, LL.D., F.R.S., President, in the chair.

The Secretary called the attention of the meeting to the opening of the Insectarium in the Society's Gardens, which had taken place on the 25th April, and read a report on the insects that had been reared and exhibited there, drawn up by Mr. Watkins, the Superintending Entomologist.

Mr. F. M. Balfour read a paper on the development of the skeleton of the paired fins of the Elasmobranchs, considered in relation to its bearings on the nature of the limbs of the Vertebrata. The object of the investigations recorded in this paper was explained by the author to be twofold—*viz.*, on the one hand, to test how far the study of the development of the skeleton of the fins supported the view which had previously been arrived at by the author, to the effect that the paired fins were the specialised and highly developed remnants of a once continuous lateral fin on each side; and, on the other, to decide between the views of Gegenbaur and Huxley and Thacker and Mivart as to the primitive type of fin-skeleton. The author pointed out that the results of his researches were entirely favourable to the view that the paired fins were structures of the same nature as the unpaired; and that they gave a general support to the views of Thacker and Mivart. They clearly showed that the pelvic fins retained more primitive character than the pectoral. Conclusions were drawn somewhat adverse to the views recently put forward on the structure of the fin by Gegenbaur and Huxley, both of whom considered the primitive type of fin to be most nearly retained in *Ceratodus*, and to consist of a central multisegmented axis with numerous rays on its two sides. It appeared, in fact, that the development of the skeleton demonstrates that a biserial type of fin like that of *Ceratodus* could not have been primitive, but that it must have been secondarily derived from a uniserial type, by the primitive bar along the base of the fin (the "basipterygium") being rotated outwards, and a second set of rays being developed on its posterior border.

Mr. W. T. Blanford read some notes on a collection of Persian Reptiles recently added to the British Museum, amongst which was an example of a new species of Lizard, proposed to be called *Agama persica*.

A communication was read from the Rev. O. P. Cambridge on a new Spider of the family *Theraphosidæ*. The chief interest attaching to this Spider was the fact that it had lived in the Gardens of the Society from March to October, 1880. Mr. Cambridge proposed to name the species *Homœomma Stradlingii*, after Dr. Stradling, who had brought home from Bahia the specimen in question.

Mr. G. E. Dobson read a paper on the pharynx, larynx, and hyoid bones in the *Epomophori*, indicating some very remarkable peculiarities of structure, in which these Bats appear to differ not only from all other Chiroptera, but from all other mammals. Pharyngial air-sacs were also described in the males of *Epomophori monstrosus*, *franqueti*, and *comptus*.

Mr. J. Gwyn Jeffreys read the third of the series of his memoirs on the Mollusca procured during the 'Lightning' and 'Porcupine' expeditions 1868-70. The present paper contained an account of the families from *Kelliidæ* to *Tellinidæ*. Eleven new or hitherto unfigured species were described. The geographical, hydrographical, and geological distribution of the species enumerated were fully given.

Mr. F. C. Selous read a paper on the South African Rhinoceroses, based upon specimens collected and observations made during nine years' hunting in Southern and South-central Africa. Mr. Selous had come to the conclusion that in these countries only two well-marked species of *Rhinoceros* existed, namely, the square-mouthed *Rhinoceros simus*, and the prehensile-lipped *R. bicornis*.

June 21, 1881.—Prof. W. H. Flower, LL.D., F.R.S., President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of May, 1881, amongst which special attention was called to an African Wild Ass (*Equus tæniopus*) from Upper Nubia, and a White-winged Duck (*Anas specularis*) from Antarctic America, both new to the collection.

Mr. R. Bowdler Sharpe exhibited a specimen of *Podilymbus podiceps*, stated to have been killed at Radipole, near Weymouth, in the winter of 1880-1.*

Mr. W. A. Forbes read a paper on the Petrel called *Thalassidroma nereis*, by Gould. This, he showed, was not a true *Procellaria*, but must form the type of a new genus, proposed to be called *Garrodia*, most closely allied to *Oceanites*, *Fregetta*, and *Pelagodroma*, and constituting with them a distinct family of "*Tubinares*," proposed to be called "Oceanitidæ."

Mr. W. A. Forbes read a paper on the conformation of the thoracic extremity of the trachea in the "Ratite" birds, calling particular attention to the existence of a highly-developed syrinx in the genus *Rhea*, in which respect it differed from all the other genera comprised in that group.

A communication was read from Mr. George F. Bennett containing an account of the habits of the *Echidna hystrix* of Australia, as observed by him during three years' exploration of their native haunts.

Mr. G. A. Boulenger read a paper on the Lizards of the genera *Lacerta* and *Acanthodactylus*, prepared after a study of the specimens of these genera in the collection of the British Museum.

Mr. F. C. Selous read a paper in which he gave an account of the Antelopes that had come under his observation during a residence of eight years in central South Africa. The author exhibited a series of skins of the Bush-buck (*Tragelaphus sylvaticus*), and pointed out their variations in different localities, also specimens of the Poku (*Cobus Vardoni*) and Speke's Antelope (*Tragelaphus Spekii*).

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* For some additional remarks on this specimen, see "Occasional Notes."

A communication was read from the Rev. O. P. Cambridge, containing an account of some new genera and species of *Araneidea*.

Mr. Sclater pointed out the generic divisions of the *Bucconidæ* which he proposed to adopt in his Monograph of the group now approaching completion, and characterised a new species of the family under the name *Nonnula cineracea*.

Mr. R. Bowdier Sharpe communicated some notes on new or rare species of Flycatchers lately added to the collection of the British Museum, principally from the Gould collection. The new species described were proposed to be called *Malurus cyanochlamys*, *Siphia obscura*, and *Rhipidura Macgillivrayi*.

A second paper by Mr. Sharpe contained an account of several collections of birds formed by Mr. W. B. Pryer in the district of Sandakan, in North-eastern Borneo. Two new species were described as *Lanius Schalowi* and *Dicæum Pryeri*.

Lieut.-Col. H. H. Godwin-Austen read the second portion of his paper on the Land Shells collected by Prof. J. Bayley Balfour during his recent expedition to the Island of Socotra. The present paper contained an account of the family *Helicaceæ*.

Mr. G. E. Dobson communicated some notes on certain points in the muscular anatomy of the Green Monkey (*Cercopithecus callithrix*).

Dr. A. Günther exhibited and read a description of a specimen of *Schedophilus medusophagus*, a Mediterranean fish new to the British fauna, lately captured off the coast of Ireland.

This meeting closes the present session. There will be no more scientific meetings until next November, when the session for 1881-82 will commence.—P. L. Sclater, *Secretary*.

Entomological Society of London.

June 1, 1881.—H. T. Stainton, Esq., F.R.S., &c., President, in the chair.

The Rev. E. N. Bloomfield, M.A. (Guestling Rectory, Hastings, Sussex), was balloted for and elected an Annual Subscriber to the Society.

Mr. J. Jenner Weir, on behalf of Mr. J. W. Douglas, read some notes on various Homoptera, and exhibited the specimens referred to.

Mr. T. R. Billups exhibited a long series of *Crabro clavipes*, Linn., bred this year from *Cynips Kollari* galls, collected at Wimbledon. Also a specimen of *Molorchus minor*, Linn., taken at Headley Lane on May 9th last, feeding on larch. Mr. Billups observed that this Longicorn was apparently rare in Britain, as Dr. Power had only met with one specimen, this also on larch, and that Mr. Douglas took two at Headley Lane sixteen years ago.

Mr. E. Saunders said he took a specimen of *M. minor* at Wandsworth the year before last.

Mr. John Sang, who was present as a visitor, exhibited some varieties of British Lepidoptera.

The Secretary read a communication from Mr. G. E. Piercey, asking for the identification of an insect noxious to travellers in Central Asia, and lately mentioned by the 'Daily News' special correspondent amongst the Tekké Turcomans, under the name of "shep-quez" (="bite the stranger").

Mr. E. A. Fitch thought most probably the creature referred to was the *Argas persicus* of Fischer de Waldheim; the habits of this tick and the effects produced by its attack, as related by Kotzebue and Dupré, agreeing fairly well with the account given in the correspondent's extracts.

Mr. W. F. Kirby remarked that the symptoms of the bite of the so-called "poisonous bug" of Persia (*Argas reflexus*), as described at a previous meeting, so much resembled those of malignant pustule—a disease well-known to be conveyed by flies—that it would be important to ascertain whether the bite of the *Argas* was itself venomous or merely a vehicle for the conveyance of morbific matter.

The Secretary then read the report of the committee appointed at the last meeting to enquire into the supposed presence of the *Phylloxera* on the vines in Victoria.

The Secretary next read a communication from the Colonial Office, enclosing a report from Her Majesty's Vice-Consul at the Dardanelles, respecting the appearance in the Troad of an insect alleged to be destructive to the locust eggs; and asking for an opinion as to the possibility of the introduction of this insect, should its habits be correctly described, into Cyprus.

The President stated that this communication had been considered by the Council of the Society, and they had resolved that Sir Sidney S. Saunders, Messrs. C. O. Waterhouse, and E. A. Fitch be appointed a committee to investigate the subject and report.

Lord Walsingham read a paper entitled "The *Tortricidæ*, *Tineidæ*, and *Pterophoridæ* of South Africa," which included a complete list of the described South African species, characterizing several as new, which had lately been collected by Mr. W. D. Gooch in Natal, and made remarks on the affinities and general geographical distribution of the species, a few of which were exhibited.

Mr. A. G. Butler communicated a memoir "On the genus *Sypna* of Guénée, a group of Lepidoptera of the tribe Noctuites."

Mr. W. L. Distant communicated "Descriptions of Rhynchota from the Australian and Pacific Regions," including, with other *Pentatomidæ*, four new species of the genus *Menida* from Australia.

July 6, 1881.—H. T. STAINTON, Esq., F.R.S., &c., President, in the chair.

Mr. George Henry (38, Wellington Square, Hastings) was balloted for and elected an Ordinary Member of the Society. Mr. A. S. Olliff (36, Mornington Road, Regent's Park, N.W.) was elected an Annual Subscriber to the Society.

Mr. W. L. Distant exhibited the sexes of *Morpho Adonis*, Cram.; the female of this butterfly apparently had previously been quite unknown.

Miss E. A. Ormerod exhibited some elm-leaves received from Islay, Argyllshire, which were almost bleached, the parenchyma being cleared away by minute larvæ; also several sawfly larvæ from a meadow at Rochdale, Lancashire, where they were committing extensive ravages; specimens of a sawfly larva from Clitheroe, Lancashire, received with the Noctua larvæ now so destructive to grass in that district; and specimens of a sawfly larva received from Marlborough, Wilts, where it is attacking the wheat. Miss Ormerod also exhibited living specimens of the Noctua larvæ, which lately occurred as a "plague" at Clitheroe, and observed that these differed somewhat from the published descriptions of the larva of *Charæas graminis*.

Mr. Stainton remarked that he did not with certainty know the larva of *C. graminis*, but believed those now exhibited belonged to that species; with regard to the elm-leaf blotchers, he did not recognise them as Micro-Lepidopterous, but thought possibly it was a Coleopterous larva attacking them.

Mr. E. A. Fitch recognised the sawfly larvæ from Rochdale as belonging to the *Doleridæ*, and said that he had received similar larvæ from Romford, Essex, and Huddersfield, Yorkshire: in both localities they were sent as doing damage to the grass crops; he also observed how little was known of the life-histories of the numerous species of *Dolerus*.

The Rev. A. E. Eaton exhibited drawings by Mr. A. T. Hollick, illustrating some *Ephemeridæ* nymphs in Dr. Hagen's collection.

Sir Sidney S. Saunders exhibited several female specimens, with larvæ and pupa-case of *Callostoma fascipennis*, Macq., received from Mr. Frank Calvert of the Dardanelles; the larva of this fly lives in the egg-cases of locusts and feeds on the eggs. Several of these egg-cases and a young locust (*Caloptenus italicus*), but two days old, which had been bred by Mr. F. Enock, were exhibited.

The Secretary read the report of the Committee appointed at the last meeting to enquire into the history of the insect feeding on the locust-eggs in the Troad, respecting which a communication had been received from the Colonial Office.

Mr. F. Moore communicated some "Descriptions of new Asiatic diurnal Lepidoptera."

Mr. D. Sharp sent a communication "On the species of the genus *Euchroma*," having reference to the two known species belonging to that genus of the *Buprestidæ*.

Mr. J. W. Douglas communicated "Observations on the species of the Homopterous genus *Orthezia*, with a description of a new species" (*O. Normani*).

Mr. A. G. Butler communicated a further paper "On the Lepidoptera of the Amazons collected by Dr. James W. H. Trail during the years 1873 to 1875," Part IV. Geometrites. This part of the collection consists of eighty-two species, thirty of which prove new to Science.

Prof. Westwood communicated "Notes on larva of *Nycteribia*," by Baron R. Osten-Sacken.

Mr. W. F. Kirby read "Notes on new or interesting species of *Papilionidæ* and *Pieridæ* collected by Mr. Buckley in Ecuador."—E. A. Fitch, *Hon. Sec.*

NOTICES OF NEW BOOKS.

The Norwegian North Atlantic Expedition, 1876-78: *Zoology—Fishes*. By Robert Collett. Large 4to, pp. 164, with five plates, three woodcuts, and map. Christiana: Grondahl and Son.

In this handsome quarto volume, with most carefully executed lithographs, we have a section of the General Report on the Zoological Results of the Expedition organised by the Norwegian Government for the Scientific Exploration of the North Atlantic. This Expedition made three voyages in the years 1876, 1877 and 1878, and several preliminary memoirs have been published in various scientific Journals, dealing briefly with the chief results obtained in different branches of scientific research. Two of these papers, by Mr. Collett, relating to the Deep-sea Fishes collected on the Expedition, were published in 1878, but without illustrations. Having been carefully revised and considerably expanded, they are now embodied in the more important quarto before us.

During the first two voyages of 1876 and 1877, the number of fishes obtained was comparatively small, while the additions made to our knowledge of invertebrate forms were both numerous and important. The small number of fishes collected was believed to be due to the unsuitable nature of the dredging-apparatus at first employed, as well as to the fact that, in 1876, the investigations were carried on almost exclusively at great depths in the cold area between Norway and the shores of Iceland, where the marine fauna is less rich, perhaps, than in some localities farther north. In the summer of 1877, when the results were somewhat greater, the operations were carried on in shallow water, partly on the banks off the Norwegian coast, and partly in the neighbourhood of Jan Mayen Island.

The ichthyological results from the first two voyages having thus proved less satisfactory than was anticipated, especial care was taken, when fitting out the Expedition for the final voyage in 1878, to provide apparatus which should be adapted for securing not only the various species of invertebrate animals which might be met with, but also the deep-sea fishes which there was reason to believe would be found, were suitable apparatus employed for taking them. A special form of trawl-net was therefore constructed, and, in localities where it could properly be worked, was employed with considerable success. Mr. Collett reports that fishes were brought up at well-nigh every haul, sometimes only two or three perhaps, but more frequently a larger number; the net being worked at various depths down to 1400 fathoms.

The region investigated in 1878 comprised, southward, the tract between Hammerfest and the Varanger Fjord, eastward and westward the expanse of ocean stretching towards Novaja Zemlia and Jan Mayen, and northward that extending to the north-western extremity of Spitzbergen.

The number of species collected on this the final voyage amounted in all to thirty-three, of which six proved to be new to Science. Of the eleven species obtained on the two preceding voyages, ten were again met with, including a new species of *Lycodes*, i. e., *L. muræna.* Several representatives of this genus were unexpectedly found to occur at considerable depths. *Lycodes frigidus*, for example, one of the newly-described species, was brought up from depths varying from 600 to 1300 fathoms, and almost exclusively in spots where the temperature of the water was below zero.

The seven species regarded by Mr. Collett as new are *Raia hyperborea*, *Liparis bathybii*, *Lycodes frigidus*, *Lycodes pallidus*, *Lycodes lütkeni*, *Lycodes muræna*, and *Rhodichthys regina*, the last mentioned representing a new genus.

The Expedition has thus brought to light seven new species and one new genus, all of them true forms of deep-sea fishes.

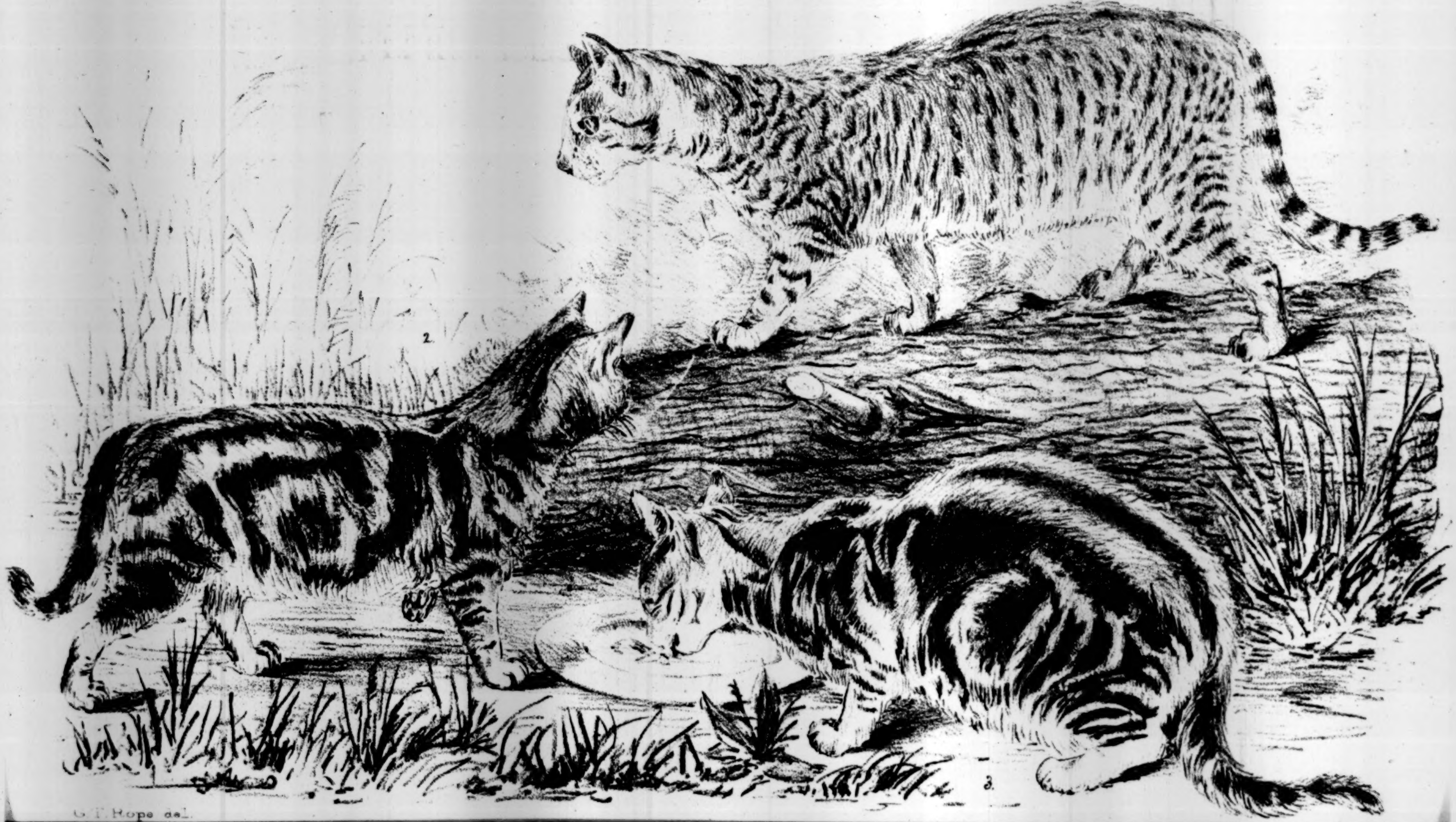
These are all figured by Mr. Collett in the present work, together with several other species more or less rare. So far as can be judged without actual comparison with the specimens, the plates strike us as being most carefully and accurately executed. With the exception of *Rhodichthys*, they are uncoloured, but as full details of the coloration are included in the description of each species, there can be no difficulty in identification.

In most of the specimens collected, Mr. Collett, assisted by Prof. Sars, was careful to examine the contents of the stomach, an examination which, he tells us, proved of considerable interest, not only by contributing to our knowledge of the distribution of divers invertebrate species in northern latitudes, but also from its having substantiated the very remarkable fact that several of these pelagic forms of animal life, whose habitat was generally believed to be near the surface, possess the power of descending to the greatest depth in which deep-sea fishes have been met with, where they attain even a larger size than those taken in the upper strata of the water.

The labours of ichthyologists within the last few years have brought to light a number of new forms belonging to the genus *Lycodes*, which is now found to comprise a greater number of species than any of the other Arctic deep-sea fishes yet known.

To work out the new species of this genus collected by the North Atlantic Expedition, and to determine their precise relationship to types already established, must have been no easy task; and some idea of the labour bestowed by Mr. Collett on this report may be gained by reference—for instance—to his remarks upon this genus (pp. 77—84), wherein, after pointing out some of the difficulties to be contended with, he gives a critical review of the bibliography of the genus, and a tentative summary of the species, of which he recognises eighteen. In this single chapter we have good evidence of the careful way in which Mr. Collett has drawn up his Report, which in every respect is an important contribution to ichthyological science.

We have only to add that, being wisely printed in Norwegian and English, in parallel columns, it cannot be regarded as a sealed book to English readers, like many valuable scientific memoirs of Scandinavian origin which have preceded it.



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